

FEASIBILITY OF ORGANO-BERYLLIUM TARGET MANDRELS USING ORGANO-GERMANIUM PECVD AS A SURROGATE*

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Target capsules for Inertial Confinement Fusion (ICF) experiments made of beryllium or beryllium-containing materials are very attractive for the high energy implosions anticipated in the National Ignition Facility (NIF). The challenges in preparing beryllium capsules that will allow for diffusional filling of the hydrogenic fuel and that have an appropriate surface roughness are significant.

This paper discusses the feasibility of preparing beryllium rich organo-beryllium coatings using plasma enhanced chemical vapor deposition (PECVD) as a route to prepare advanced NIF capsules. PECVD is a more generalized form of the organic plasma polymerization process we currently use to make target ablaters. There are a number of organometallic beryllium compounds known which would be suitable precursors for this process. We will demonstrate a concept for the safe handling and plasma CVD of these compounds.

Experiments on a surrogate chemical system using tetramethylgermanium as the organometallic precursor demonstrate that coatings with a high degree of germanium metal incorporation can be prepared. Methods to determine the germanium-to-carbon ratio will be described and the results used to suggest how one might run the current plasma polymerization device to prepare useful organo-beryllium coatings.

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